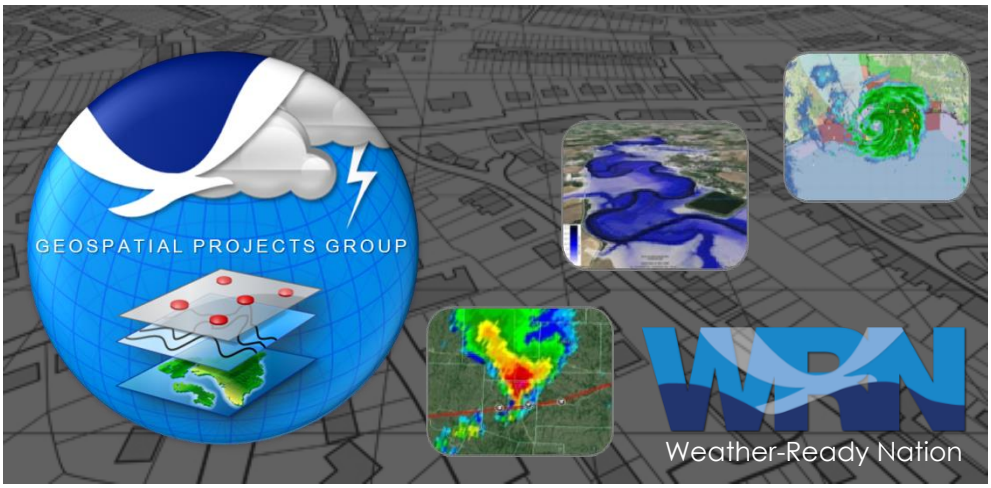


NWS Geospatial News

Your source for sharing geospatial news, projects, and activities across the National Weather Service

Situational Awareness & Decision Support

Improvements to the Enhanced Data Display a.k.a. EDD

By: Jonathan Wolfe - NWS Mesoscale Science to Operations Pilot Project - Charleston, WV

EDD is a mashup of many meteorological, hydrological and climatological geospatial datasets and tools from around the NWS and elsewhere. It tries to bring everything together into one interface without overwhelming the user. EDD aims to leverage other efforts – often recycling and reusing their code – in order to create the best display without duplication of effort. This article focuses on some of the enhancements that have been made to the interface in the last year. Additional background on the impetus for EDD was given in the Fall 2012 issue of the NWS Geospatial News - http://www.crh.noaa.gov/images/ilx/GIS/gis_day/NWS_GIS_News_Fall_2012.pdf.

Toolset

EDD comes with a rich set of tools that allow a well-trained forecaster to brief directly from EDD or quickly generate the graphics that they need to make a briefing at any DSS event. Two of these tools, the "Time of Arrival" tool and the "Drawing" tool are shown in Figure 1. In fact, the NWS Pittsburgh office had a training event on EDD for their partners and found out that their partners were using the interface to brief themselves.

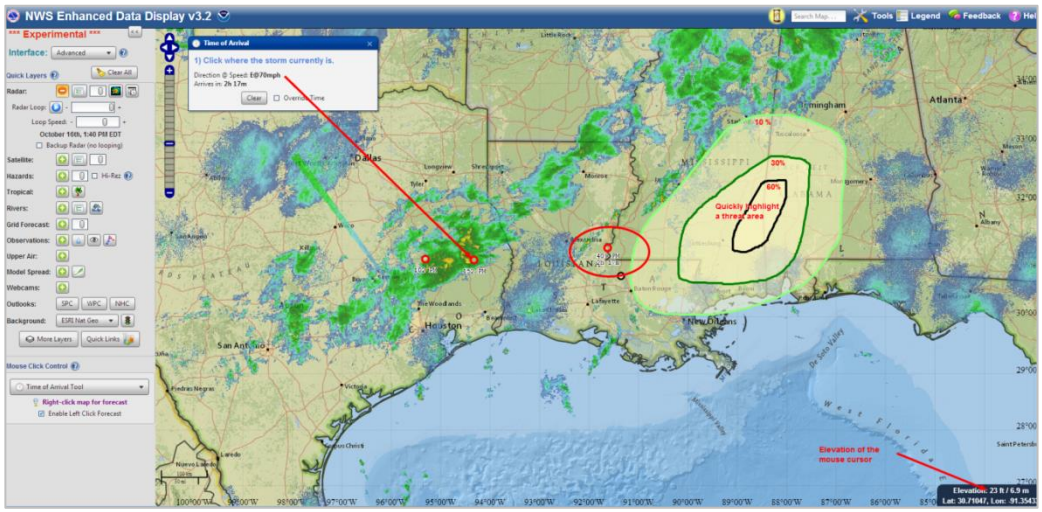


Figure 1 - Shown here is the "Time of Arrival" tool and a threat area depicted using the "Drawing tool". Other tool options include: range rings and measuring distances and areas.

In this issue

Another useful feature of EDD is that you can re-create the interface via url (Figure 2) by using the "Save/Share" button which generates a TinyURL that you can send to partners in email briefings, post on social media - you name it! You can also generate a QR code which mobile users can scan and share as well. The great thing about this is that if you send it Friday afternoon and the forecast makes a major swing at 200 AM Saturday morning, the url will remain current since it is a live feed to the most current data. It does not go stale!

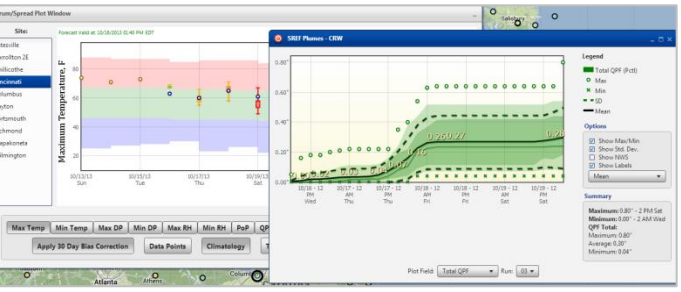


Figure 2 - The "Save/Share" feature of EDD.

Figure 3 – Some of the probabilistic tools available in EDD. On the left is the Model Spectrum or Spread and on the right are SREF plumes.

Finally, if you dig deep enough in EDD (hint: under "More Layers" there are 250+ layers that can be accessed - use the search box to quickly get relevant material), you will likely find what you're looking for. There is so much more to the web application than what originally appears on the screen. For example Figure 3 above, shows some of the probabilistic tools available which cover most of the country. There are plans to incorporate the Caribou Snow/Precip tools as well.

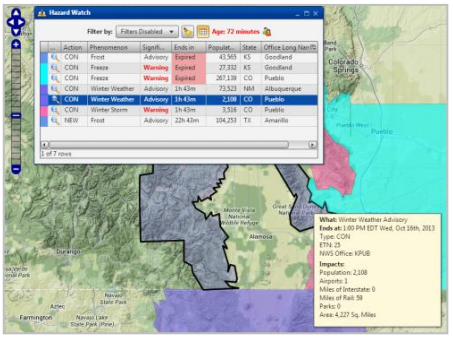


Figure 4 – The new and improved interactive hazard layer with associated impacts.

Data

EDD is data friendly in the sense that most datasets can be easily incorporated into it without much effort. This is particularly true when it comes to adding Web Mapping Services (WMS). Much of the data currently in EDD uses these or similar services. EDD is beginning to use a lot more GeoJSON to make the page more interactive – be sure to check out the interactive Hazards Layer (Figure 4) which implements some nice work on hazard impacts on population done by Brian Walawender (CR) and Kevin Scharfenberg (HQ). This table updates based on the map bounds and the table is synced to the mouse so that when you are on the map, the table highlights and vice versa. There are also a multitude of filters that you can apply to the table to quickly distill the warnings down to a targeted group of hazards or zoom to the warning.

Framework

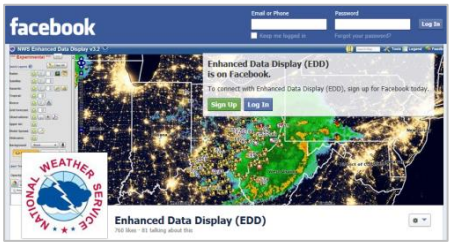
EDD brings the many efforts made across the NWS together efficiently by compartmentalizing features using the powerful Javascript API called Qooxdoo (pronounced kooks-do). This set of tools turns Javascript into an object oriented language. In fact, EDD uses 100% open-source software; OpenLayers is the mapping framework that is used and the Flot Javascript library plots many of the interactive graphics found within EDD.

On the backend, EDD utilizes the libraries available on its host NIDS which is on the GovCloud (which means EDD should scale proportionately with load, but not necessarily its data): MapServer via MapCache, PostgreSQL, PostGIS 2.0+, and GDAL do much of the data manipulation and formatting. However, many layers come from existing data sources which helps spread the load across many servers rather than just a handful. Most notably, the Ridge2 Tilecache is used extensively. In the future, it would make for a better user experience if all of the data was cloud-based so that major events do not bog down the bandwidth and server capacity, but that is still on the to-do list and is quite the undertaking.

EDD uses an advanced caching mechanism so that after the initial load of EDD much of the page is just reloaded from your browsers local data storage making subsequent visits much quicker to load. Qooxdoo also employs obfuscation and minification in the resultant build directory coupled with the server's gzip compression which makes EDD a slim 550 KB – quite impressive for all that it does. Just remember that when a new release is launched to clear your browser's cache.

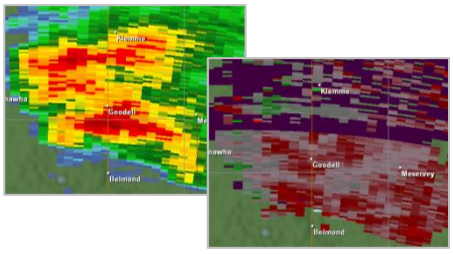
The fact that EDD is entirely web-based is both good and bad. Good in that you can access it anywhere and share it with anyone, but bad in the sense that if your bandwidth suffers or there are major demands on web servers the interface will be slow.

There is much more to EDD that is detailed in the help section of the EDD site. If you have not tried EDD, give it a shot. The url is: http://preview.weather.gov/edd (stable releases) and internally at http://dev.nids.noaa.gov/~jwolfe/mwp/trunk/edd/build/ (cutting edge releases – this has the latest and greatest). Feedback is appreciated and can be submitted by using the feedback button on the upper right! You can also follow along on Facebook to see what's new and what has changed with the interface: https://www.facebook.com/nwsedd.



*Note that on the opening/loading screen it provides the browsers that it has been tested in and that IE8 and 9 are not the best platforms to view EDD in, but they still work in them just not at an optimum level. This is mainly due to the fact that EDD uses the latest in web technology and the JavaScript engines that came with IE<10 are inferior to the present web standard.

Products, Services & Studies



Radar imagery from June 12, 2013

A warehouse was destroyed and partially swept from its foundation on the north side of Belmond

Utilizing High Resolution Satellite Imagery to Aid in a Tornado Damage Survey

By: Kevin Skow - NWS Weather Forecast Office - Des Moines, IA

At the beginning of 2013, the NWS Central Region (CR) began partnering with the USGS in a pilot project, known as "Emergency Satellite Support", aimed at providing high resolution reconnaissance satellite imagery to local WFOs immediately following a high impact event. The WFO initiates the request with CR, specifying the desired area they wish to have photographed and imagery characteristics (multispectral or panchromatic, low or high resolution, etc.). CR forwards the information to the USGS, who will attempt to use a satellite that fits the criteria. Each request is usually fulfilled within a few days depending on satellite availability and cloud cover.

On the afternoon of June 12, 2013, a storm cell produced a series of tornadoes across north central Iowa, including one that struck the outskirts of the community of Belmond. Photographic and radar evidence, combined with near-storm environmental data, suggested that these tornadoes possessed many characteristics of landspouts. This made these tornadoes very unusual due to the cyclic nature of their development, along with their strength and longevity.

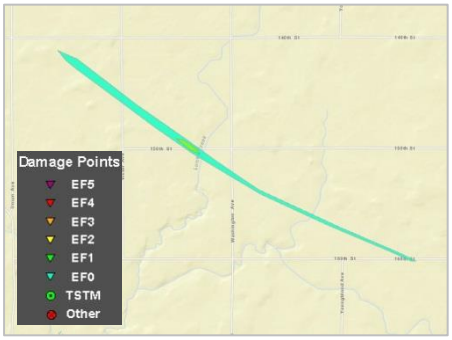
The following day, a team of experienced storm surveyors travelled from WFO Des Moines (DMX) to assess the damage. This was the third ground survey conducted by DMX using the newly implemented Damage Assessment Toolkit (DAT), and the second using the office's iPad. An off-duty television meteorologist also allowed the surveyors to use his personal remote-controlled quadcopter to capture low altitude aerial photos at several points along the damage track. At the end of the day, based on the observed damage and eyewitness accounts, the surveyors estimated that six tornadoes (1 EF3, 1 EF2, 2 EF1, and 2 EF0) occurred along a 25 mile stretch.

WFO Des Moines was one of the first CR offices to invoke the Emergency Satellite Support following the June 12 tornadoes, initiating the request on the morning after the event. The USGS photographed the affected area with the Worldview-2 satellite two meter panchromatic sensor. Other passes were made using the Worldview-2 multispectral sensor and additional satellites, but their resolution was sub-par compared to the panchromatic data and could not resolve the narrow damage paths. The imagery was subjectively compared to Google Maps background satellite imagery used in the DAT and the tracks traced out by hand in the DAT. This was necessitated due to both the huge file size of the GeoTIFF files (500-900mb) and the inability for the DAT to import any external shapefile/kml file. Ideally, it would have been great to import the satellite data into the DAT to trace out the tracks. As an added benefit, comparing the pre-event satellite imagery in Google

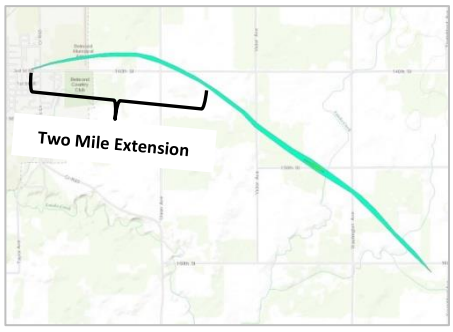
Display of tornado tracks published the day after the survey, before satellite imagery was available.

Original Track - Tornado #1

Final Track - Tornado #1



Original Track - Tornado #3



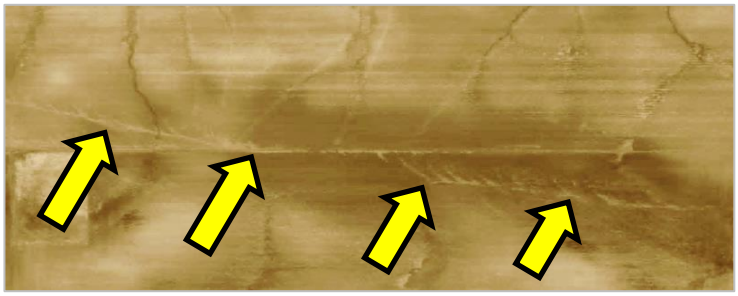
Final Track - Tornado #3

Maps to the post-event imagery helped filter out any features (natural or anthropogenic) that could be mistaken for a tornado tracks.

The satellite data proved extremely valuable in piecing together the tracks of the original three tornadoes noted by the ground survey. The DAT-screen capture on the left shows the tornado tracks published on the day following the ground survey, before the satellite imagery was available. Tornado #1 was the strongest of the tornadoes (EF3) and also garnered the most media attention since it damaged the northern and eastern outskirts of Belmond. Tornado #2 was a brief touchdown west of Belmond witnessed by law enforcement. Finally, Tornado #3 formed to the east of Belmond and tracked southeast for several miles before dissipating.

Tornado #1

The survey team originally plotted the beginning of Tornado #1 at a location two miles NW of Belmond based on an eyewitness report of the touchdown. The narrow damage field at this location, coupled with aerial photos from the quadcopter also showing a narrow path beginning in the nearby field, lent credibility to this report. However, satellite data revealed distinct swirls extending to the WNW (yellow arrows in image below) for another two miles beyond the original start location. Given the slow movement of the tornado, this two mile extension pulled the start time back by eight minutes. The remainder of the track of Tornado #1 was well-documented by the survey team and only minimal changes were made based on the satellite data.



Tornado #2

Tornado #2 was reported to have briefly touched-down in a field to the south of Tornado #1 as it was approaching Belmond. The survey team found no damage in the area but noted this tornado in the preliminary write-up. Satellite data revealed no field scouring in this area. This, combined with the updated position of "Tornado #3" as a result of the satellite data (see section below), provided strong evidence that the eyewitness was watching the development of the latter tornado, thus Tornado #2 was the same as Tornado #3. The tornado was stricken from the record after reviewing the satellite data and additional video evidence.

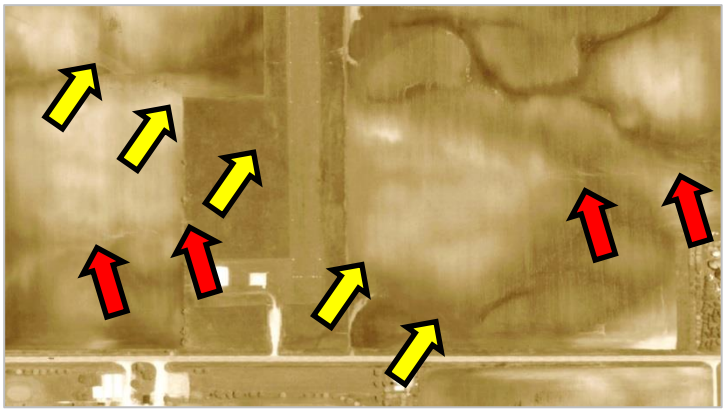
Tornado #3

As the survey team travelled to the east of Belmond, they were initially unable to find any evidence of a track. It didn't take long, however, before the team ran across a scoured field less than two miles ESE of Belmond. Given the relatively close proximity of this track to the last known damage point on the east side of Belmond and the fact that it was on the same trajectory as the previous path, the team naturally connected these two points into a single track. But the idea of a singular track faded quickly the day following the survey when the office received a video that clearly showed Tornado #1 dissipating just east of Belmond, indicating that these were two separate entities. Thus, the beginning location for "Tornado #3" (officially now Tornado #2) was plotted just to the NW of where the survey team first located a track to the east of where Tornado #1 dissipated.

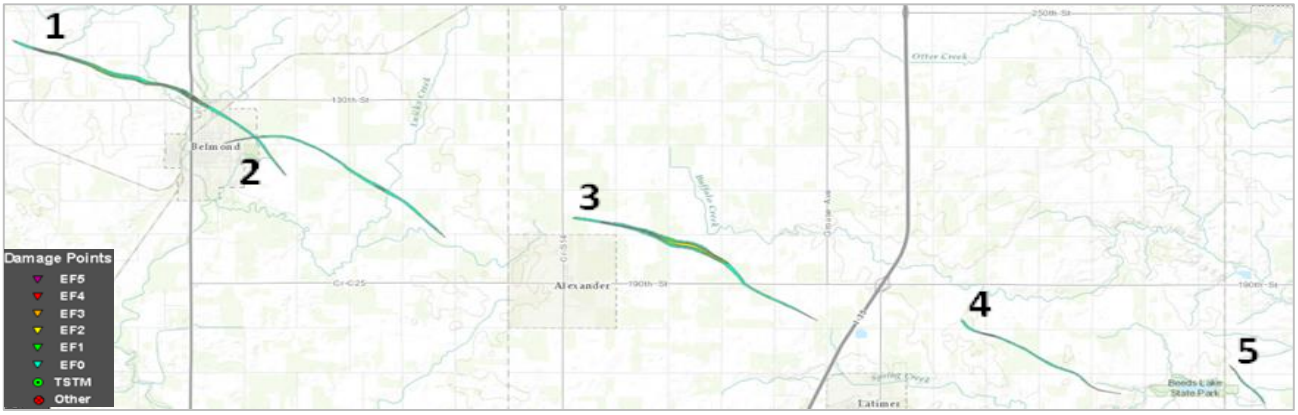
A careful analysis of the satellite imagery revealed that this tornado actually touched down on the eastern side of Belmond, two miles to the WNW of its estimated start location. It was here that a mesonet weather station on the Belmond Elementary School was blown off the roof. This damage had been initially attributed to an RFD-like wind with Tornado #1 tracking 1000 yards to the northeast. No other damage was noted to any trees or structures surrounding the school. However, just 500 feet to the north of the county road leading east out of Belmond, faint, intermittent swirls can be found in the satellite imagery along an ENE path that can be traced directly back to the school. This circulation becomes more pronounced after crossing the city airstrip and then turns to the east and

An older house was detached from its cinder block foundation and destroyed on the north side of Belmond.

southeast before meeting up with surveyed track. This extended track also crosses the path of Tornado #1 at the Belmond airstrip (image below, yellow arrows denote Tornado #1, red arrows denote Tornado #3). A video obtained after reviewing the satellite imagery shows that Tornado #3 formed on the east side of Belmond as Tornado #1 was entering the north side of down. Tornado #3 then progressed to the east and southeast while Tornado #1 turned southeast and crossed its path ten minutes later. While the video helped determine the timing of the tornadoes, it was shot from a long distance away and would not have aided in plotting the track location.



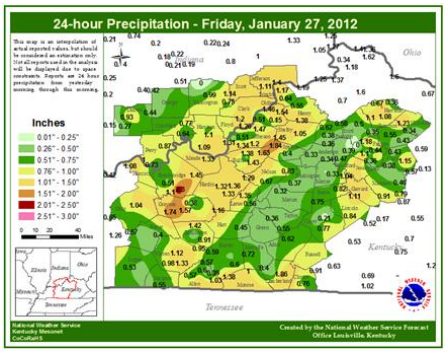
Overall, this event was a successful demonstration in the usage of satellite data to locate tornado tracks. The traditional ground survey is still needed to ascertain an accurate rating of a tornado, but satellite imagery helps fill in the voids that ground surveyors may miss due to poor road networks or a lack of time. It stands alongside photo, video, and eyewitness accounts as a means to accurately document a tornado. This was a relatively small and confined tornado event, but for an expansive tornado outbreak, satellite data could become invaluable for locating smaller tornadoes that might be missed on a ground survey. Combined with the DAT, this imagery enabled DMX to create incredibly high resolution tornado tracks for archiving in Storm Data. The final tornado tracks determined for the June 12, 2013 event can be seen in the graphic below. After a review of the satellite data, the number of tornadoes decreased from six to five.



EzDialog Added to GIStools

By: Mike Callahan - NWS Weather Forecast Office - Louisville, KY

Using the modules in GIStools, in particular arclib, one can create standalone programs that generate maps. This way, non-GIS users can create their own maps, without enduring the sometimes complex interface of ArcMap. If the programs don't require user input, it is easy to create batch files that can be launched either using Task Scheduler for automated routine maps, or from a shortcut for as-needed maps. However, this becomes quite a problem for maps that require user input.



Included in arclib is a progress box to let the user to know what is happening. Also, any error messages can be trapped easily. However, it only includes a very simple class that creates a GUI that asks for a filename and a title. But this is extremely limited for only the simplest interface.

It is possible to create extremely complex and modern-looking interfaces with the library that come with ArcGIS 10.1 due to it being based on Python 2.7. This library is Tkinter which

has been enhanced with ttk. Tkinter is the interface to the Tk library which has been included with almost every Python installation. Tk was showing its age but it was recently updated to ttk. This new library takes advantage the native GUI widgets of an operating system. Thus, an interface using ttk, looks like a native Windows, Mac, or Linux interface.

However, writing GUI interfaces can be a tricky business. Thus, EzDialog was created to make this process much easier. It is based on the appearance of the ArcGIS tool interface. For example, to the right are screen shots of an ArcGIS tool dialog box, and a box that collects the same data using EzDialog.

The widgets included in EzDialog are Entry Box, Combo Box, Checkbox Row, Radio Button Row, Open Dialog, Save As Dialog, and Command Button Row. While this is a very limited subset of what is available in ttk, most dialogs can be created using these widgets. The widgets are contained in a labeled frame which the programmer can space as they like. All frames are centered in the dialog window. Again the goal of EzDialog is simplicity for the programmer.

The module includes a guide that walks the programmer through creating a simple interface, a more dynamic interface, and the above interface which can update the list in the Lookup Field section based on the filename given in the Input Shapefile section. By the way, the amount of code to accomplish the last example is only 14 lines using EzDialog.

EzDialog will let the programmer concentrate on the GIS work, and not worry so much about designing the interface dialog. This is a new module which will be improved in the future as programmer's requests are added. In the meanwhile, if you are writing standalone scripts that need user interfaces, you should find the first version useful.

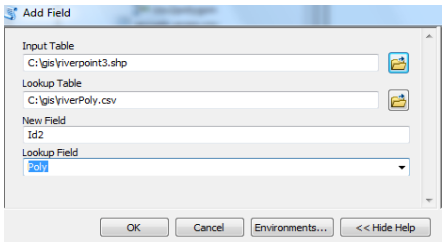


Figure 1 – Interface for Tool Using ArcGIS

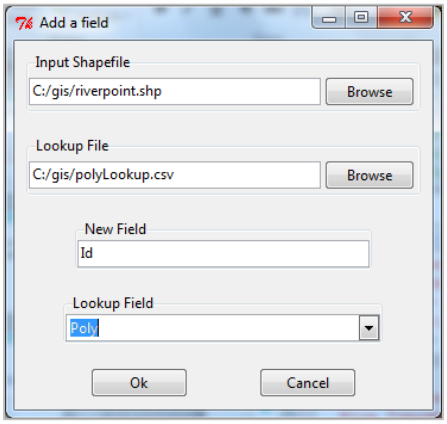


Figure 2 – Interface for Standalone Script Using EzDialog

LIFERAY®

Virtual Lab (VLab)

By: Tom Filiaggi - NWS Headquarters MDL - Silver Spring, MD

The Virtual Lab is a new NWS initiative designed to improve project management as well as collaboration amongst various agencies. Unfortunately, when someone hears about the VLab, it is not always clear exactly what it can do or will do, and how it is better than our current situation, and so it's adoption by the larger NWS community has been sporadic and sputtering. One solution to this problem is to do a better, more intentional job of advertising the VLab and educating the NWS community regarding the expected benefits, which is why this article is being written. Another solution is to provide more demonstrations, which is also being planned.

What is the VLab?

The NWS Virtual Lab - or VLab - is a collection of web resources that enhances topical online communities (Collaboration Services) and provides basic software project management tools (Development Services). VLab uses the "Liferay" platform to implement Collaboration Services and "Redmine" to manage Development Services.

What is a Community?

In the VLab, a "Community" is a sub-collection of web resources that encourages collaboration and communication across disparate organizations. It provides easy ways to share knowledge and discuss topics relevant to a swath of NWS-related issues. These topics can relate to, among other things, operations, research, research-to-operations, NWS customer management, AWIPS, and, of course, Decision Support Services (DSS). The VLab can host a large number of communities.

What Can a VLab Community Provide?

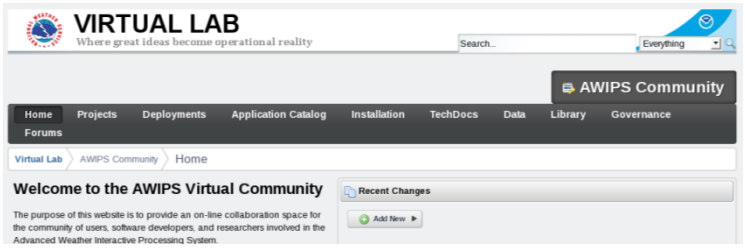
The Liferay community platform provides an enormous amount of customization and flexibility in defining community web content. Ultimately, the community's content is defined by the community, or whoever the Community Manager authorizes to craft the community content.

Some of the basic functions that a VLab Community can provide are:

- Wiki
- Forum (with email distribution - aka lyris listservers)
- Document Library
- Calendar
- Blog
- Custom pages

. . . but, the modules that constitute a Community page are very customizable, allowing for things like CSS web design elements.

Here is an image of the AWIPS VLab Community home page, which shows its embedded content pages along the gray tab bar:

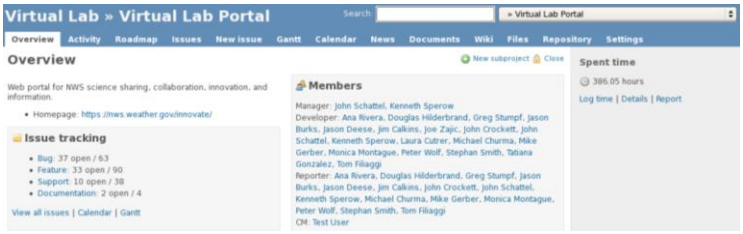


What is a VLab Project?
A VLab "Project" is essentially a software development project, though it could be used for non-software projects as well.

What Can a VLab Project Provide?
The Redmine project management platform provides various project management tools, such as:

- Issue Tracking
- Code Repository
- Change Management
- Workflows
- Activity summaries
- Standardized charts and reports

Here is an image of the VLab "VLab Portal" Project home page, which shows its embedded content pages:



How is the VLab Accessed?
Anyone with a NOAA email address can log into https://nws.weather.gov/innovate and log in using their email access credentials. Once logged in, they can access VLab Communities. Any community that is open to the general VLab populace will be listed as Communities that can be joined. Private communities require the Community Manager to include individuals manually.

Anyone with a NOAA email address can log into https://collaborate3.nws.noaa.gov/ and log in using their email access credentials. Once logged in, they can access Projects, request to join existing projects, or request to create new projects.

For those individuals who do not have a @noaa.gov email address and who wish to be a member of the VLab, a sponsor (someone with a @noaa.gov email address) must submit a request on behalf of the non-affiliated person.

How Could VLab Benefit GIS in NWS?
The VLab provides many things that could have value to GIS in NWS. Some potential benefits are:

- The Community Forums could allow for the discussion of various GIS application techniques. This can take the place of the lyris email listserver, providing a better archive interface and more comprehensive communication tools.

- The Community Wiki can be a repository for the descriptions of how to do various things in GIS apps used by NWS (such as Arc).

- The Community Calendar can be used to coordinate events.

- The Community Document Library can house case study and presentation files, for easy use by those other than the authors.

- The Development Repositories could house the various scripts used to manage GIS data, either in or out of an application.

- The Development Issue Trackers can be used to note problems in scripts and applications, to be worked by those parties responsible for the software.

- The Development Activity functions can provide summaries of recent changes to the Projects being tracked.

- Because the VLab is so flexible and customizable, there are many additional benefits to be found, once the community decides they are important and provides them either on the Collaboration or Development sides.

Tom Filiaggi is the current Community Manager for "GIS in NWS", but as he does not have as much GIS experience as many in the NWS GIS community at large, he could use some help in defining exactly what content the VLab GIS Community should contain.

You can ask for help regarding VLab usage or provide feedback about the VLab, through the VLab:
https://nws.weather.gov/innovate/group/guest/contact-us

VLab Collaboration Services:
https://nws.weather.gov/innovate

VLab Development Services:
https://collaborate3.nws.noaa.gov

NOAA Awards Enterprise-wide GIS Software & Services Contract - NOAA Esri Enterprise License Agreement (ELA) Announcement

By: Kim Jenkins & Randy Warren - NOAA Coastal Services Center - Charleston, SC

On September 26, 2013 an Enterprise License Agreement (ELA) with Esri was awarded for all of NOAA. The Esri ELA contract was put into place through a joint effort between the NOAA GIS Committee, NOAALink Program Office, and NOAA's Acquisitions & Grants Office. The ELA brings Esri desktop and server software, GIS training, ArcGIS Online, and various other benefits to NOAA:

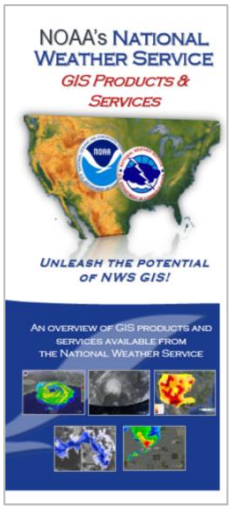
Software: The ELA provides unlimited access to GSA Category A software, which includes popular items such as ArcGIS for Server, ArcGIS for Desktop, 3D Analyst, and Spatial Analyst. It also provides discounts on GSA Category B and C software.

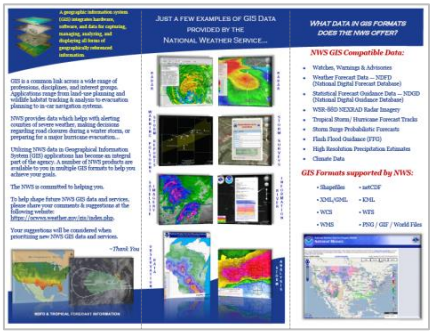
Training: The ELA also provides unlimited access to Esri's Virtual Training Campus, which offers hundreds of self-paced, online courses such as "Designing Maps with ArcGIS," "ArcGIS Online: Publisher Workflows," and "Python Scripting for Geoprocessing Workflows."

ArcGIS Online: NOAA now has its own subscription to ArcGIS Online, which allows for creation of interactive maps and apps, and the ability to easily share your geospatial content with colleagues and partners. ArcGIS Online can also host the popular "story map" that allows map makers to easily inform and educate their audience through pre-designed map templates.

Other Benefits: Additionally, the ELA provides passes to the annual Esri User Conference and Developer Summit, discounts on instructor-led training, and discounts on professional services. Most important is the on-site Esri staff member starting December 2, 2013 to help NOAA implement and make the most of the ELA.

Working under the direction of the NOAA CIO Council, the GIS Committee is working hard to roll out all of these benefits to NOAA as fast as possible. In the meantime, you can stay updated on our progress by visiting the NOAA GIS Community Site. In the next few weeks, we'll be rolling out FAQs and instructions for accessing software and services under the ELA. Stay tuned!





GIS Day: Wednesday, November 20th

GIS Day is Wednesday, November 20th. To help promote GIS Day across the National Weather Service, a 2013 GIS Day webpage has been developed from the collaborative efforts of both Central and Southern Region Geospatial Project Groups. NWS offices can create a "Top News of the day" link directly to the page at http://www.crh.noaa.gov/ilx/?n=gisday or you can copy the source code and modify it for your local office. This is a great way to educate the public on how the National Weather Service utilizes the capabilities of GIS to enhance our products and services.

An outreach brochure, like the one portrayed on the left, is also available via a link on the NWS GIS Day webpage. You are encouraged to use this brochure as needed for outreach events and conferences to promote NWS GIS products and services available to the public!

For additional GIS Day information and resources, please check out the GIS Day webpage at...http://www.gisday.com/. You can also find more info on their Facebook page at...http://www.facebook.com/gisday.

Please share your GIS Day activities, stories, and pictures with us! We will include them in the next edition of the NWS Geospatial Newsletter!

The NWS Geospatial Newsletter is provided by the Central Region Geospatial Projects Group, with content submitted from across NOAA and the National Weather Service. Thank you to everyone who contributed to this edition of the newsletter!

Article Submissions:
If you would like to submit content for future newsletters then please contact the editor, Darrin Hansing, at darrin.hansing@noaa.gov.

GIS Article ideas:
- DSS Initiatives
- Project write-ups
- Training links, tips & tricks
- Conferences and outreach
- Geospatial tools
- New products and web services
- Research enhanced through the use of GIS